December 13, 2024

1200 New Jersey Avenue, SE Washington, DC 20590



Pipeline and Hazardous Materials Safety Administration

DOT-SP 20952 (SECOND REVISION)

EXPIRATION DATE: 2027-12-31

(FOR RENEWAL, SEE 49 CFR 107.109)

1. <u>GRANTEE</u>: Capella Space Corp. San Francisco, CA

2. <u>PURPOSE AND LIMITATION</u>:

a. This special permit authorizes the transportation in commerce of a satellite assembly that includes low production lithium ion battery assemblies contained in equipment and non-DOT specification cylinders. This special permit provides no relief from the Hazardous Materials Regulations (HMR), the International Maritime Dangerous Goods (IMDG) Code or the International Civil Aviation Organization's Technical Instructions for the Safe Transport of Dangerous Goods by Air (ICAO TI) other than as specifically stated herein. The most recent revision supersedes all previous revisions.

b. The safety analyses performed in the development of this special permit only considered the hazards and risks associated with the transportation in commerce.

c. This special permit serves as an approval under Special Provision A88 of the ICAO TI and as a "Competent Authority Approval" as defined under 49 CFR § 107.1.

d. This special permit serves as an "exemption" as defined in 7.9.1 of the IMDG Code for cylinders without a pressure relief device and as an exemption to the ICAO TI for the transportation of UN1005, Ammonia, anhydrous aboard cargo aircraft. For international flights, the ICAO TI may require exemption authorization by the States of origin, transit, over flight, and destination of the consignment, as well as the state of the air operator.

e. No party status will be granted to this special permit.

3. <u>REGULATORY SYSTEM AFFECTED</u>: 49 CFR Parts 106, 107 and 171-180.

- 4. <u>REGULATIONS FROM WHICH EXEMPTED</u>: 49 CFR § 173.185(a)(1) in that lithium battery assemblies have not passed the criteria in Part III, subsection 38.3 of the UN Manual of Tests and Criteria, Column (9B) of the § 172.101 Hazardous Materials Table and Columns 12 and 13 in Table 3-1 of the ICAO TI in that anhydrous ammonia may be transported aboard cargo-only aircraft, as specified herein, the "Q" value requirements for anhydrous ammonia in 4;1.1.9(e) of the ICAO TI are waived, and § 173.301(f) of the HMR and 6.2.1.3.4 of the IMDG Code in that the non-DOT specification packaging is not fitted with a pressure relief device.
- 5. <u>BASIS</u>: This special permit is based on the modification application of Capella Space Corp. dated April 3, 2024, submitted in accordance with § 107.105 and the public proceeding thereon and additional information dated July 15, 2024.

Hazardous Materials Description			
Proper Shipping Name	Hazard Class/ Division	Identi- fication Number	Packing Group
Ammonia, anhydrous**	2.2/2.3	UN1005	N/A
Lithium ion batteries contained in equipment including lithium ion polymer batteries*	9	UN3481	N/A
Xenon, compressed	2.2	UN2036	N/A

6. HAZARDOUS MATERIALS (49 CFR 172.101):

*Only low production lithium ion battery assemblies contained in equipment (satellite) ("Low production" is defined as a production run of no more than 100 cells or battery assemblies annually of a particular type) may be offered for transportation and transported under the terms of this special permit.

**Division 2.3 for international transportation. Division 2.2 as an alternate when only domestic transportation is involved.

7. <u>SAFETY CONTROL MEASURES</u>:

a. <u>OPERATIONAL CONTROLS</u>:

(1) The battery assemblies contained in equipment (the second and third generations of the Capella satellite) are comprised of the number of cells as described in the September 27, 2019, and April 3, 2024, applications on file with the Office of Hazardous Materials Safety (OHMS).

(2) The second generation of the satellite contains two battery assemblies with a total energy content of 760 Wh.

(3) The third generation of the satellite contains three battery assemblies with a total energy content of 1140 Wh.

(4) Cells and the battery assemblies contained in equipment must be protected against short-circuiting.

(5) The battery assemblies contained in equipment must be equipped with an effective means of preventing dangerous reverse current flow for cells and battery assemblies that are connected in parallel.

b. <u>TESTING</u>:

(1) Cells must be of a type that has been successfully tested in accordance with the UN Manual of Tests and Criteria, Sixth Revised Edition.

(2) The lithium battery assemblies contained in equipment must have passed testing necessary for ensuring survival in space and during launch including thermal, vacuum and vibration testing as described in the application dated September 27, 2019.

c. <u>PACKAGING</u>:

(1) Inner Packaging:

(i) Each battery assembly must be contained in equipment which is built with a strong, impact resistant casing and be securely mounted to equipment to prevent movement within the equipment.

(ii) Heat pipes containing UN1005, ammonia, anhydrous must be constructed of axially grooved tubing (aluminum alloy 6063 or 6061 or 300 series stainless steel or combination thereof) with an end cap and fill tube welded to opposing ends, not to exceed the amounts for each of five pipes described in the Capella's July 15, 2024, supplement and on file with the OHMS and not to exceed 1 liter in volume. The piping system must be tested hydraulically to failure after going to cyclic loading and unloading. The minimum burst pressure is 5,650 psig and the hydraulic test pressure is 1,400 psig.

(iii) The design of the Astra cylinder holding xenon must be based on the ISO 11119-2 Standards. This is a non-DOT specification carbon fiber composite overwrapped cylinder with an aluminum welded liner. It has a nominal volume of 5 liters and maximum expected operating pressure (MEOP) of 2,650 psia at 60 $^{\circ}$ C (140 $^{\circ}$ F) and proof pressure tested to

3,975 psia at 60 °C (1.5xMEOP). It has a minimum burst pressure of 17,275 psig. The tank is filled to not more than 1,690 psia at 35 °C (95 °F) during transport.

(iv) The design of the Orbion cylinder holding xenon must be based on the ISO 11119-2 Standards. This is a non DOT specification composite overwrapped cylinder with an aluminum welded liner. It has a nominal volume of 3.3 liters and maximum expected operating pressure (MEOP) of 2,570 psia at 60 °C (140 °F) and proof pressure tested to 3,855 psia at 60 °C (1.5xMEOP). It has a minimum burst pressure of 11,200 psig. The tank is filled to not more than 1,640 psia at 35 °C (95 °F) during transport.

(2) Outer Packaging: Inner packaging must be placed in a rigid handling case enclosed with protective panels and mounted on shock and vibration isolators and further placed in a palletized plywood box as described in the packaging information dated November 13, 2019.

(3) The net weights of the second and third generation battery assemblies within each package must not exceed 4 kg (9 pounds) and 6.3 kg (14 pounds), respectively.

(4) When transported aboard aircraft, battery assemblies and equipment must conform to Packing Instruction 910 of the Supplement to the ICAO TI.

d. <u>MARKING</u>: Each outer package covered under the terms of this special permit must be durably and legibly marked and displayed on a background of contrasting color with "DOT-SP 20952".

e. Each air carrier who is offered anhydrous ammonia for transportation under the terms of this special permit must be a party to a special permit or be granted a special permit authorizing such transportation.

8. <u>SPECIAL PROVISIONS</u>:

a. Under the terms of this special permit, the grantee may only offer hazardous materials (i.e., the grantee is not authorized as a carrier).

b. A person who is not a holder of this special permit who receives a package covered by this special permit may reoffer it for transportation provided no modification or change is made to the package and it is reoffered for transportation in conformance with this special permit, the HMR, the IMDG Code, and the ICAO TI.

c. A current copy of this special permit must be maintained at each facility where the package is offered or reoffered for transportation.

d. This special permit in no way affects the need to obtain any required authorizations from other agencies of the United States Government or from the competent authorities of the States of origin, transit, and destination of the consignment, For UN1005, ammonia, anhydrous, this special permit in no way affects the need to obtain any required authorizations from other agencies of the United States Government or from the States of origin, transit, over flight, and destination of the consignment, as well as the state of the air operator.

- 9. <u>MODES OF TRANSPORTATION AUTHORIZED</u>: Motor vehicle, cargo vessel and cargo-only aircraft.
- 10. <u>MODAL REQUIREMENTS</u>: A current copy of this special permit must be carried aboard each cargo vessel, aircraft, or motor vehicle used to transport packages covered by this special permit. The shipper must furnish a copy of this special permit to the air carrier before or at the time the shipment is tendered.
- 11. <u>COMPLIANCE</u>: Failure by a person to comply with any of the following may result in suspension or revocation of this special permit and penalties prescribed by the Federal hazardous materials transportation law, 49 U.S.C. 5101 <u>et seq</u>:
 - o All terms and conditions prescribed in this special permit and the Hazardous Materials Regulations, 49 CFR Parts 171-180.
 - o Persons operating under the terms of this special permit must comply with the security plan requirement in Subpart I of Part 172 of the HMR, when applicable.
 - o Registration required by § 107.601 <u>et seq</u>., when applicable.

Each "Hazmat employee", as defined in § 171.8, who performs a function subject to this special permit must receive training on the requirements and conditions of this special permit in addition to the training required by §§ 172.700 through 172.704.

No person may use or apply this special permit, including display of its number, when this special permit has expired or is otherwise no longer in effect.

Under Title VII of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) — "The Hazardous Materials Safety and Security Reauthorization Act of 2005" (Pub. L. 109-59), 119 Stat. 1144 (August 10, 2005), amended the Federal hazardous materials transportation law by changing the term "exemption" to "special permit" and authorizes a special permit to be granted up to two years for new special permits and up to four years for renewals.

12. <u>REPORTING REQUIREMENTS</u>: Shipments or operations conducted under this special permit are subject to the Hazardous Materials Incident Reporting requirements specified in 49 CFR §§ 171.15 - Immediate notice of certain hazardous materials incidents, and 171.16 - Detailed hazardous materials incident reports. In addition, the grantee(s) of this special permit must notify the Associate Administrator for Hazardous Materials Safety, in

writing, of any incident involving a package, shipment or operation conducted under terms of this special permit.

Issued in Washington, D.C.:

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for William Schoonover Associate Administrator for Hazardous Materials Safety

Address all inquiries to: Associate Administrator for Hazardous Materials Safety, Pipeline and Hazardous Material Safety Administration, U.S. Department of Transportation, East Building PHH-13, 1200 New Jersey Avenue, Southeast, Washington, D.C. 20590.

Copies of this special permit may be obtained by accessing the Hazardous Materials Safety Homepage at <u>https://www.phmsa.dot.gov/approvals-and-permits/hazmat/special-permits-search</u>. Photo reproductions and legible reductions of this special permit are permitted. Any alteration of this special permit is prohibited.

PO: SH/TG